Cost-conscious medical decision-making: patients’ perspectives on screening and physicians’ roles regarding cost barriers

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Background: As costs rise and high deductible health plans proliferate, patients increasingly face financial barriers to care. Prior research has shown that: patients want to have cost conversations with their doctors; doctors feel these conversations are important; and these conversations rarely happen. Little is known regarding how patients want their doctors to consider cost-efficacy tradeoffs. We evaluated patients’ preferences regarding novel strategies to screen for financial barriers to care. We also conducted an experiment to assess patients’ preferences regarding physician engagement in cost-conscious medical decision-making.

Methods: We conducted a mail survey with an embedded randomized experiment in a sample of 1,400 individuals who had applied for financial support from a patient assistance foundation (HealthWell Foundation). A total of 842 responded (107 incorrect addresses, 6 deceased; response rate: 65%). Our instrument focused on three domains: a) patient comfort with health care team members screening for cost barriers; b) patient comfort with tools to screen for cost barriers; c) patient comfort with physician decision making styles in the context of cost barriers. For the latter, we randomized respondents to receive 1 of 3 vignettes depicting physician decision styles for initiating a new medication with a cost-efficacy tradeoff: 1) cost conscious choice (physician chooses cheaper) 2) cost indifferent choice (physician chooses more expensive) 3) patient directed choice (physician presents options and defers to patient). All respondents were then asked to rate a version of the vignette that was modified to reflect a shared decision style. On a 10-point Likert scale, scores ≥7 reflected that patients were “very comfortable” with the screening method or doctor’s approach.

Results: Among respondents, 81% were very comfortable with their doctor asking about problems paying for medications. Fewer patients were very comfortable being asked by pharmacists (75%, p=0.002), nurses (69%, p<0.001), professional counselors (68%, p<0.001), and trained volunteers (51%, p<0.001). 59% were very comfortable with their doctor’s office reviewing medical records to screen for cost barriers. In comparison, 53% were very comfortable with insurers (p=0.026), 62% with pharmacies (p=0.17), 62% with completing a form in their doctor’s office (p=0.16), and 48% with a screening email from their doctor (p<0.001). Overall, patients who trusted their doctor more were more likely to be comfortable with all team members and screening tools (p<0.001 for all). In our randomized experiment, respondents were uncomfortable deferring decisions to their physician. Only 25% of patients were very comfortable with the vignette in which a physician made a cost-conscious decision to prescribe a less expensive drug. In comparison, 33% of patients were very comfortable with the cost indifferent vignette, in which the doctor prescribed the most expensive drug (p=0.055) and 58% were very comfortable with the vignette in which the patient directed the decision (p<0.001). 85% reported that they were very comfortable with the doctor and patient making a shared decision.

Conclusions: In our sample of patients experiencing financial barriers to care, participants were generally comfortable with diverse strategies to screen for cost barriers. Regarding decisions with cost-efficacy tradeoffs, patients preferred to engage in shared decision-making with their doctors.
Evidence-based risk communication: A systematic review

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Background: Effectively communicating the risks and benefits of tests and therapies to patients is critical for shared decision-making. The method of communicating risk affects patients’ comprehension and perceptions, but the best formats remain unclear. We systematically reviewed the literature on methods of communicating probabilistic information to patients to determine which presentations maximize patients’ understanding, satisfaction, and decision-making.

Methods: We searched Medline, CINAHL, Embase, and Cochrane CENTRAL from 1966 through December 2011 using terms related to patients, communication, risk, and outcomes of comprehension, preferences, and decision-making. We included all cross-sectional or prospective trials with an active control group that compared different methods of communicating the same risk. We excluded studies of health care providers and non-English language studies. One author reviewed titles and abstracts. Two authors independently reviewed full text and disagreements regarding inclusion were settled by consensus. Two authors independently abstracted information about the study population, interventions, and outcomes and assessed risk of bias using standard tools. Data were summarized with descriptive statistics. Study heterogeneity precluded meta-analysis.

Results: Of 20,088 citations retrieved, 604 were selected for full text review. Seventy-six unique citations containing 85 studies (64 randomized trials) were included. The median number of participants was 266 (range 24 to 16,133). The most frequent comparisons were between variations of pictographs or icon arrays (IA) (15 comparisons), IA vs. natural frequencies (number of events out of stated denominator, NF) (8 comparisons), IA vs. bar graphs (7 comparisons), absolute risk reduction (ARR) vs. relative risk reduction (RRR) (6 comparisons), number needed to treat (NNT) vs. RRR (5 comparisons), and NF vs. NNT (4 comparisons).

Studies comparing IA to NF and bar graph had mixed results. With small risks, IA led to less overestimation of risk than NF. Compared with bar graphs, IA improved accuracy for incremental risks but results were split for overall risks. IA were associated with lower confidence in decisions, and sometimes considered confusing.

Studies comparing IA presentations had several findings. IA displaying only sick subjects led to poorer risk understanding than those displaying sick and healthy subjects. For IA depicting total populations, there was less participant worry when incremental risk rather than overall risk was presented. Providing baseline and incremental risks in a single IA rather than two separate IA improved comprehension. A horizontal layout was more favorable than vertical.

Participants perceived risks more accurately when presented with ARR compared with RRR. RRR was associated with a higher probability of accepting therapy or screening. NNT led to less accurate risk perceptions and less satisfaction with decision-making compared with RRR and NF.

Conclusions: The literature regarding methods of communicating risk is vast and heterogeneous in terms of formats, specific comparisons, outcomes, and outcome measurement. IA, NF and ARR appear best for overall accuracy of risk estimation, while bar graphs are better understood than IA in some instances. RRR has the greatest impact on behavior. A consensus statement to guide future study methodology would enhance consistency and reproducibility and optimize determinations of comparative effectiveness.
Clinicians and Numbers: Usability and Validity of a Measure of Critical Risk Interpretation (CRIT)

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Background: Misinterpretation of benefits and harms can bias testing and treatment decisions and communication with patients. A valid measure of clinician risk interpretation is needed to assess the effect that risk interpretation has on clinical performance. We sought to determine the acceptability and validity of a measure of critical risk interpretation among different groups of clinicians.

Methods: The critical risk interpretation test (CRIT) was developed by the authors to measure a clinician’s ability to: 1. modify interpretation based on meaningful differences in the type of outcome or timeframe of a risk, 2. maintain a stable interpretation when a risk is framed in different ways and 3. correctly interpret how testing modifies risk (Table 1). Questions were developed and revised based on literature review and expert feedback. Each item was made up of 2 or more separated survey questions with items scored as correct based on the ideal responses presented in Table 1. Items with missing answers were counted as incorrect and each of the 10 items counted for 1 point. Scores on the 10 items were then transformed onto a 100 point scale.

We recruited 380 clinicians at educational conferences to take a self-administered paper test: 115 nurse practitioners (NPs), 131 third year medical students, and 134 residents in internal medicine at 2 institutions. Using a web-based survey, we administered the same test to 17 national experts (7 physicians and 10 non-physician researchers) in critically evaluating health news. We aimed to explore the test’s usability, content validity, convergent validity, and predictive validity and used linear regression to test trends of test scores across groups.

Results: Item usability was excellent (< 3% non-response for each item). Item difficulty was broad (proportion of respondents who answered items correctly was 7% to 56%). The mean score was 42 on a 100 point scale (standard deviation 13; range 11-82). Experts had favorable views of the CRIT’s clarity and content validity (Table 2). Supporting convergent validity, scores on our test correlated with other tests of related abilities – Berlin Numeracy Test (r=0.28, p<0.001); Cognitive Reflection Test (r=0.18, p=0.004). Mean test scores varied as expected among groups with differences in prior evidence-based medicine training (35 for NPs, 43 for medical students, 45 for residents, and 59 for physician experts; p<0.0001).

Conclusions: Our test of critical risk interpretation is usable, discriminates among clinicians, and demonstrates content, convergent, and predictive validity.
Cost-Effectiveness of Novel Oral Anticoagulation Strategies for Treatment of Atrial Fibrillation

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Background: Oral vitamin K antagonists such as warfarin dramatically reduce the risk of thromboembolism in patients with atrial fibrillation (AF) but are challenging to use. The new anticoagulants and using genetic information to guide warfarin dosing appear to result in superior clinical outcomes but it is unclear whether their use is cost-effective.

Methods: We created a Markov state transition to compare five scenarios in patients with newly diagnosed AF at high risk of thromboembolic stroke with no contraindications to warfarin: dabigatran 150 mg twice daily, apixaban 5 mg twice daily, rivaroxaban 20 mg once daily, genotypically-guided warfarin dosing and standard warfarin therapy. The effectiveness of these strategies was based upon data from randomized controlled trials. Other parameters were derived from the peer-reviewed literature. The model was run from a societal perspective with a lifetime horizon. Effectiveness was measured in quality-adjusted life-years (QALYs) and costs in 2011 US dollars.

Results: Compared with standard warfarin therapy, genotypically-guided warfarin was more effective and less costly while the cost of apixaban, rivaroxaban, and dabigatran were $93,062, $111,465, and $140,557 per additional QALY gained, respectively. At a threshold of $100,000 per QALY, apixaban provided the greatest absolute benefit while still being cost-effective, although genotypically-guided warfarin would be superior if apixaban was 2% less effective than observed in the ARISTOTLE trial. While apixaban was the optimal strategy in our base case, in probabilistic sensitivity analysis, genotypic warfarin was optimal in a greater number of iterations at a cost-effectiveness threshold of $100,000 per QALY.

Conclusions: While at a standard cost-effectiveness threshold of $100,000 per QALY, apixaban appears to be the optimal anticoagulation strategy, this finding is sensitive to assumptions about its efficacy and cost. In sensitivity analysis, genotypically-guided warfarin appears to be the optimal choice in the greatest number of simulations. As a result, the novel oral anticoagulants may not represent as good a value as strategies to improve INR control with warfarin.

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Background: Statin medications reduce coronary heart disease risk, but are costly and have multiple toxicities. Current primary care practice guidelines in the United States, such as ATP III, recommend offering statins only to selected patients, based on their low density lipoprotein (LDL) level and other cardiovascular risk factors. Because of lower statin costs and recent data suggesting that statins prevent CHD in broader populations, some argue these medications should be made available without a prescription.

We sought to determine in which US populations statins would prove cost-saving over a 10-year time horizon. We defined these populations by age, gender, BMI, and tobacco use. We explicitly omitted blood pressure, LDL and HDL levels, and any other serologic markers, as such data may be unavailable to statin consumers.

Methods: We used the Coronary Heart Disease (CHD) Policy Model, a dynamic state transition model of cardiovascular disease in the United States, to estimate the net cost savings associated with 10-year universal statin use (modeled as a 27% drop in LDL) in 375 sub-populations divided by age, gender, tobacco use, and BMI. We excluded current users of statins, persons with diabetes, and persons with a Framingham risk score of 20% or more (all based on self-report in the National Health And Nutrition Examination Survey, NHANES), from the analysis.

To calculate total cost associated with statin use in each population, we assumed a direct cost of $4 USD per person-month, and also estimated quality of life and toxicity costs. We estimated 97 myopathy events and 110 hepatitis events per 100,000 person-years, with a 1.6% and 0.45% risk of rhabdomyolysis and hepatic failure per episode, respectively (and associated with hospitalizations costing $11745 and $15729, respectively). We then multiplied these toxicity costs by a factor of 10, presuming statin users not seeing a physician may present later to care. We compared the sum of all of those costs with the sum of all cardiovascular event costs and quality-of-life losses prevented by the medication, calculated based on observational data.

Results: Universal low-dose statin use in all persons in the United States 35 and over is projected to prevent approximately 104,000 total deaths and 1.1 million incident cases of CHD, with a total cost of approximately $11.2 billion USD. Cost savings of approximately $1 billion would be achieved in men overall, offset by a $12.2 billion net loss in women. Universal statin use is estimated to be cost-saving overall in all men from age 45-74. In women 45-74, statin use is estimated to be cost-saving in obese smokers. Statins would not be cost-saving in any strata of women aged under 45 or over 74.

Conclusions: Universal use of statins in select US populations could avert millions of cardiac events and thousands of deaths at a net cost savings to society, even after accounting for the cost of toxicity. Statin use could be reasonably suggested to all men in the US between age 45-74, and to other high-risk populations who could self-identify based on factors such as obesity or smoking. These data suggest that a policy of over-the-counter statin availability and recommended widespread use could be substantially cost-saving.
The Effect of Information Presentation on the Decision to Undergo Elective Percutaneous Coronary Intervention

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Background: Clinical trials of percutaneous coronary intervention (PCI) for stable coronary artery disease (CAD) demonstrate that the benefits of PCI are limited to symptom relief. However, most patients believe that PCI also prevents myocardial infarction (MI). We explored subjects’ beliefs and willingness to accept hypothetical PCI depending on how information was presented.

Methods: Individuals aged ≥50 years who had never had PCI were recruited for a web-based survey. Participants were randomized to read 1 of 4 hypothetical scenarios and complete a questionnaire. Participants were asked to imagine visiting a cardiologist after experiencing stable chest pain and a positive stress test. In 3 scenarios the cardiologist described CAD as artery blockage and provided either no information about the effects of PCI on MI risk (NO INFO), specifically told the patient that PCI does not reduce MI risk (SPECIFIC INFO), or explained why PCI does not reduce MI risk (EXPLANATORY INFO). In a 4th scenario, CAD was described simply as inflammation (INFLAMMATION). Identical information about PCI complications, the role of PCI in reducing angina, and the benefits of optimal medical therapy (OMT) were provided in all scenarios. Subjects were asked if they would opt for PCI and for OMT, and how effective PCI was for preventing MI.

Results: The final sample consisted of 1678 participants (total completion rate = 89%). Mean age was 60, 51% were female and 79% were white. Overall, 52% of respondents chose PCI. Compared to the other groups, the NO INFO respondents were most likely to choose PCI (69% vs. 46%, p<0.001), and to believe that PCI prevents MI (71% vs. 36%, p<0.001). Those receiving EXPLANATORY INFO were least likely to think PCI would prevent MI (31%, p<.05 vs. other information states). Participants receiving NO INFO were least likely (83%) and those receiving EXPLANATORY INFO most likely (92%) to agree to take medications (83% vs. 92%, p<0.001). Subjects given NO INFO thought PCI was more effective than medication; the rest thought the opposite. When asked to recall what the doctor told them, 52% of the NO INFO participants falsely remembered that the doctor had told them that PCI prevented MI vs. 19% of other participants (p<0.001). Across the entire sample, belief that PCI would prevent MI was strongly correlated with the decision to have PCI (OR 9.05; 95% CI 7.37, 11.62). Other predictors of PCI were an action bias (p<0.001), being more worried (p<0.001), and having symptoms that were judged to be bothersome or limit activity (p<0.001). Age, sex, and race were not associated with the PCI decision (all p>.40).

Conclusions: In the absence of information to the contrary, most patients assume that PCI prevents MI in stable angina and are likely to choose it. Explicit information can partially overcome that bias and influence decision-making. Explaining why PCI does not prevent MI was the most effective means of overcoming this bias.